

BARRIERS TO WEB-BASED EDUCATION

Shaheen Altaf Shaikh

*Associate Professor, Department of Education & Training, Maulana Azad National Urdu University,
Hyderabad, Telangana, India*

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ABSTRACT

Introduction

Web-based Education is fast emerging as an important avenue in the Teaching Learning Scenario. It is also predicted to be the future of ICT pedagogy. Online learning with the help of the Web is a recent trend that is completely changing the way education is transacted worldwide, inside as well as outside the classroom. It is fast permeating into the transaction of regular courses through mediums of MOOCs, Swayam, NPTEL, etc.

Significance

The success of these initiatives and effective implementation of these Web-based Education programs, it is necessary to first of all, identify the barriers to web based education. This will help in the adoption of measures which will help to minimize barriers and maximize access to web-based education.

Objective

To identify the Barriers to Web-Based Education.

Methodology

A survey was conducted to identify the barriers to Web-based Education. There are a number of barriers in implementing Web-Based Education. Rogers (2003) and Ely (1990, 1999), created a model for evaluation of innovations. Their model has seven components: Resources, Infrastructure, People, Policies, Learning, Evaluation, and Support, whose Mnemonic is RIPPLES. Each of the seven components has been further elaborated upon into 5 subcomponents and used to study barriers to Web-Based Education.

Findings

The percentage level of barrier in web based education was found to be as follows : Resources =48.8%, Infrastructure = 85%, People = 72.4%, Policies= 80%, Learning= 66%, Evaluation=77.2%, and Support= 76.6%.

KEYWORDS: *Web-Based Education, Barriers, Resources, Infrastructure, People, Policies, Learning, Evaluation, Support*

INTRODUCTION

Web-based Education is fast emerging as an important avenue in the Teaching Learning Scenario. It is also predicted to be the future of ICT pedagogy. Online learning with the help of the Web is a recent trend that is completely changing the way education is transacted worldwide, inside and outside the classroom. It is fast permeating into the transaction of regular courses through mediums of MOOCs, Swayam, NPTEL, etc. Web-based education is also synonymous to e-learning Online learning, computer-assisted or based learning and technology-based learning.

Defining Web-Based Education

Web-based Education includes all the educational experiences that are transacted online using internet or web. This includes resources, study material including the features of multimedia, sound, pictures, movies, and animations, hyperlinks are provided to online resources, related websites and self-assessment tools. The teacher's role is that of a facilitator. Communication among group members and the teacher can be synchronous or asynchronous.

There are many obvious advantages of Web-Based Education (WBE). The most important one which sets WBE apart from other computer-assisted instructional methods is that **physical distances are overcome** as the need of traveling to centers of education is completely done away with. Learners can utilize WBE and take part in instructional activities irrespective of physical location. Along with flexibility in a physical location, WBE offers both synchronous as well as asynchronous learning i.e., at any time of the day or night. Another advantage which is inherent in WBE is **constant updation of the content and materials**. Teachers can update the content knowledge according to the latest advances in the domain and also alter their transaction of the course according to the needs of the learners. **24x7 availability of Web-based Educational resources** is a major plus point as the resources offered online in any course are available long after the course is completed, thus enabling the learners to access the resources as a reference whenever required. Web-based Education fulfills the promise of **individualized and personalized learning** which was considered to be an impossibility till recently. Learners have greater control over their learning because they are allowed the choice of selection from the different variety of learning resources thus enabling and ensuring more efficient learning. The learners also have the liberty to move at their **own pace** based on their motivation level, concentration and attention span. The learners who face problems while learning can pursue remedial work through repetition and revision as the resources are constantly at their disposal. Those learners who are interested in further/extra/advanced learning can explore the resources at their own inclination without hampering or inconveniencing others. Those learners who are already familiar with the topic can automatically proceed to the next without having to wait for other learners to catch up. WBE facilitates the transaction, repetition practice of the content and also aids in instant communication of detailed performance assessment and feedback. In spite of all these obvious advantages, there are a number of barriers in implementing WBE which need to be considered in order to globalize, revolutionize and maximize the benefits of WBE.

Significance

In order to effectively implement Web-Based Education, it is necessary to first of all, identify the barriers to web-based education. This will help in the adoption of measures to minimize barriers and maximize access to Web-Based Education.

Objective

To identify the barriers to Web-Based Education.

REVIEW OF RELATED LITERATURE

A systematic review of Literature was undertaken to identify the barriers to Web-based Education as enumerated in various research studies conducted on the topic. A number of researches were studied to identify the broad areas which were considered as barriers to Web based Education. Dian Schaffhauser, (2017) in the study “Biggest Barriers to Digital Learning: Lack of Time, Lack of Devices” has summarized the following findings, “The biggest barrier to digital learning for teachers is gaining student access to technology. That's followed by a lack of time during the school day. For administrators, the top concern is providing relevant and effective professional development to their staff, followed by limitations and problems with the technological infrastructure, such as WiFi and security. Overall, the main obstacle to integrating technology into the classroom was the lack of time and an insufficient number of devices to do so”. Deshmukh S.V. and Deshmukh V.P. (2017) in their paper titled “ Analysis of various Barriers to Implementation of Web-Based Technology in Education: Literature Review” have identified these barriers to web-based Education, “There are various barriers that occur while implementing web based technology in education. The types of barriers as an administrative barrier, organizational barrier, motivational barrier, attitude barrier, technical barrier, language barrier, personal barrier, competency barrier, literacy barrier and communication barriers in establishing and maintaining technology in education”. Abramenska, Vladimir, (2015), “Students motivations and Barriers to Online Education” in their Masters Thesis have conducted a survey and summarised the following findings, “The main barriers to online education are collaboration and interaction in online class and student willingness to learn and present their academic work for other students to see and assess.” Liu Jingyu (2014) “Pros and Cons: Web-Based Education” has identified the cons as “The issues of online education tend to vary significantly between institutions, professors, students, and employers. Professors and students have issues with student self-regulation and written communication.” Assareha, M. Hosseini Bidokhtb (2010) in the article titled “Barriers to e-teaching and e-learning”. has tried to present a classification of the barriers as “1.

The Learners; which has subdivision like financial problem, motivation, assessment of their progress, isolation from peers, inadequate skills and experience in distance learning, affection and social domain 2. Teacher; which has subdivision barriers like lack of adequate knowledge about e-teaching environment, the difficulty for assessment of different domain progress 3. Curriculum; ambiguity, quality, resource, teaching process, evaluation 4. The school; organizational and structural factors”. The paper also suggests some measures to overcome these barriers as follows; “Overcoming these groups of barriers needs more cooperation of related factors like curriculum developers, teachers, parent's students, social authorities, technological specialist, and also preparing virtual and actual interaction among children and teachers and society”.

Al-Senaidi et al. (2009) identified “lack of time and lack of institutional support as the major barriers to the use of information and communications technology for teaching”. Daniel W. Surry, Adrian G. Grubb, David C. Ensminger, Jenelle Ouimette, (2009) conducted a study titled- “Implementation of web-based learning in colleges of education: Barriers and enablers”. In this study, a survey was conducted and the results indicated a neutral position of colleges of teacher education towards readiness to implement WBE. The barriers identified were Resources, Infrastructure, and Support. The enablers were identified as Policies, Learning, and Evaluation. Nyirongo's (2009) research used the

RIPPLES components “to study the factors that served as barriers or enablers to the implementation of electronic technologies at a university in Malawi. She found that resources, infrastructure, people (especially shared decision making), and support (especially administrative support) were the major barriers to implementation among faculty in her sample”. Romero and Sorden (2008) used the RIPPLES model to study the implementation of an online learning management system (LMS) at a university in Mexico. “They concluded that infrastructure and support were the two most critical factors that facilitated the implementation process. They also found that policies were a barrier to implementation”. Samarawickrema and Stacey (2007) identified the variables that had a positive effect on Web-based Education. “They found that institutional variables such as top-down directives, political factors, the pressure to increase enrollments, and funding were the most important reasons why faculty in their sample adopted web-based learning”. Jasinski’s (2006) study of “The implementation of innovative practices in eLearning by vocational educators”.

This research used the RIPPLES model for the study. The tool used was an online survey with a sample size of 260 vocational educators from Australia. The findings were as follows: “The organization’s focus on learning outcomes was a key enabler of implementation, the organization’s technology infrastructure was identified as the key barrier to implementation. Support was also identified as a barrier”. Benson and Palaskas (2006) also used the RIPPLES model to study the implementation of aLMS at a university. “They found that issues related to the components of people, policies, learning, and evaluation were the highest institutional priorities needed to foster the effective implementation of the LMS at their university. They also concluded that the RIPPLES model was an effective tool for the post-adoption study of innovation and could be used to guide organizational decision making in regard to implementation”. Yan Li (2004) “Faculty perceptions about attributes and barriers impacting diffusion of web-based distance education (WBDE) at the China Agricultural University” in his Ph.D. research identified Barriers to WBE as, “CAU faculty perceived ten factors - concerns about time, concerns about incentives, WBDE program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure as moderate barriers to diffusion of WBDE”.

Methodology, Sample and Tool

A survey was conducted to identify the barriers to Web-based Education. A total of 221 Secondary School Teachers teaching in-government schools of Hyderabad, India, were used as a sample to identify the barriers to Web-Based Education. There are a number of barriers in implementing Web Based Education. Rogers (2003) and Ely (1990, 1999), created a model with seven components: Resources, Infrastructure, People, Policies, Learning, Evaluation, and Support. This model, known as RIPPLES, has been used to study the barriers to web based education. These are the broad factors on which the barriers to Web-Based Education will be analyzed. These factors have been taken as a basis and after due consultation with experts in the field, they have been further classified into 5 subfactors This has helped in the elaboration and detailing of the 7 factors and also increased the comprehensiveness of this study. The Survey Questionnaire comprised of 7 components with 5 elements in each component and thus 35 questions with a three-point scale have been developed to study the perceived level of the barrier. 1- No barrier, 2- Moderate Barrier, 3- Strong Barrier. The tool was validated through expert opinion and pilot study. The detailing of the factors and subfactors, the data analysis and the findings are summarised.

DATA ANALYSIS AND RESULTS

Resources

Resources in this context refers to all the learning materials and support materials used in the transaction of the courses which include, Reference Material/readings in the form of Word or PDF documents, videos, simulations, animations, ppt's, Tutorials, Drills, and Practice exercises, Quiz/Test, Lecture/Presentation, Case Studies, sample assignments, etc. the five dimensions studied here are as follows

Table 1

Resources				
Content	Quality Language	Variety	Usability	Accessibility

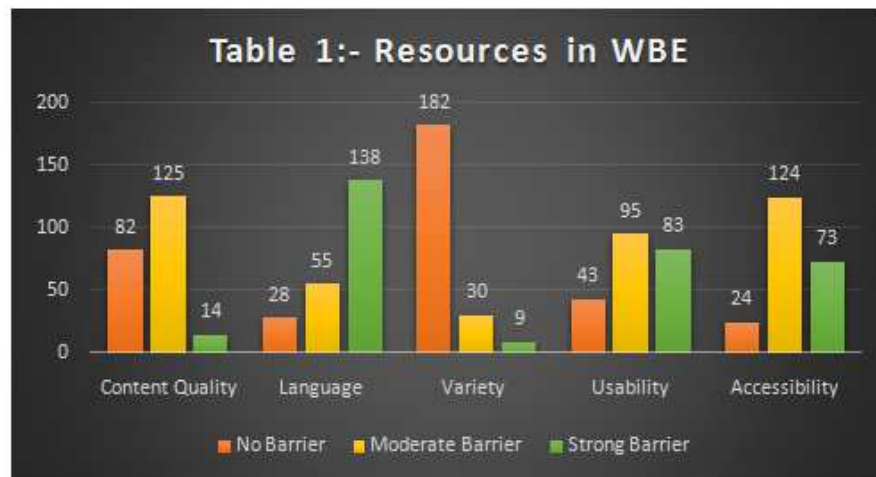


Figure 1

The results of the survey show that in resources, variety in resources is not perceived as a barrier. The quality of the content was perceived as a moderate barrier, usability and accessibility were perceived as a moderate to the strong barrier. The language was perceived as a strong barrier in WBE.

Infrastructure

Infrastructure is the backbone of any program without which any program cannot be implemented let alone be successful. In web-based education, the infrastructure required basically covers these five components.

Table 2

Infrastructure				
Availability of computer at school	Internet access at school/college	Availability of computer at home	Internet access at home	Updated software

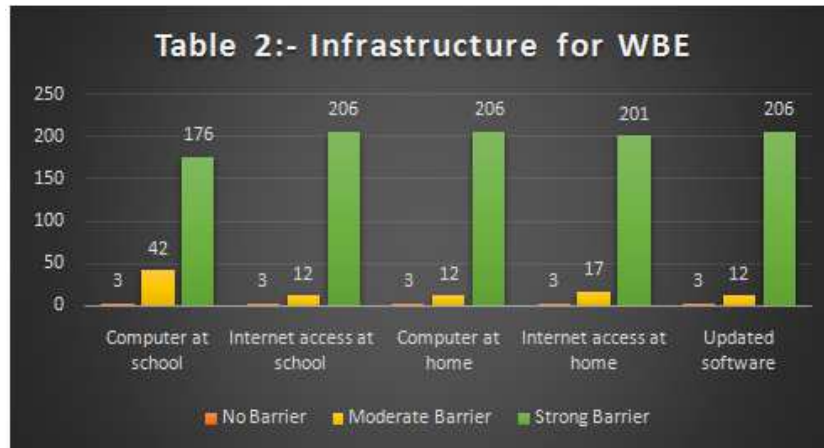


Figure 2

The results show that all the components of Infrastructure were perceived as strong barriers in the implementation of web-based education. Availability of computer at school, Internet access at school/college, Availability of computer at home, Internet access at home and Updated software were severely lacking at school as well as at home which are real hurdles blocking the universalization of web-based education.

People

The main consumers of Web-based education are teachers, students/learners. The following characteristics are necessary for web-based education.

Table 3

People				
Peer Support	Teacher Support	Self discipline (Perseverance, Time management)	Enthusiasm for learning i.e., Motivation	Technical Expertise

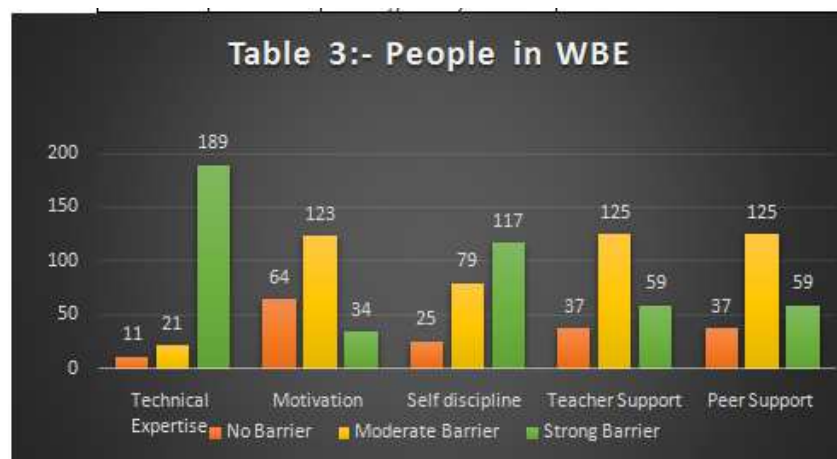


Figure 3

The results of the survey show that the technical expertise required for the transaction of web-based education is a major barrier. Self-discipline was also perceived as a major barrier. Motivation, teacher support, and peer support were perceived as moderate barriers.

Policies

The success of any initiative is determined by the prevalent policies related to that innovation and the same applies to Web-based Education also. The policies with relation to the following factors which impact Web-based Education have been taken into consideration here.

Table 4

Policies				
Curriculum	Teacher Training	Recognition/ Credibility	Finances	Administration

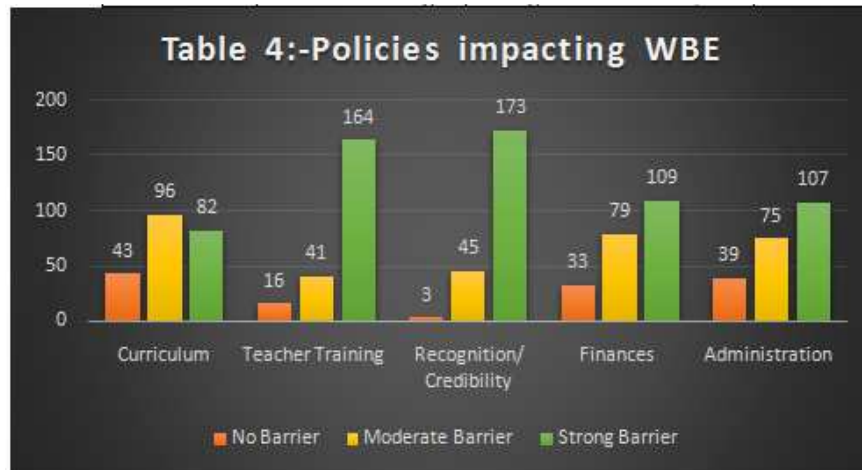


Figure 4

Out of the five criteria studied under Policies, four of them i.e., Teacher training, recognition/credibility, finances, and administration were found to be major barriers. The curriculum was perceived as a moderate barrier.

Learning

The main outcome of any educational program is its learning and in Web-Based Education it is necessary to analyze learning in relation to the following factors.

Table 5

Learning				
Quality	Achievement	Resolving Doubts	Relevance	Utility

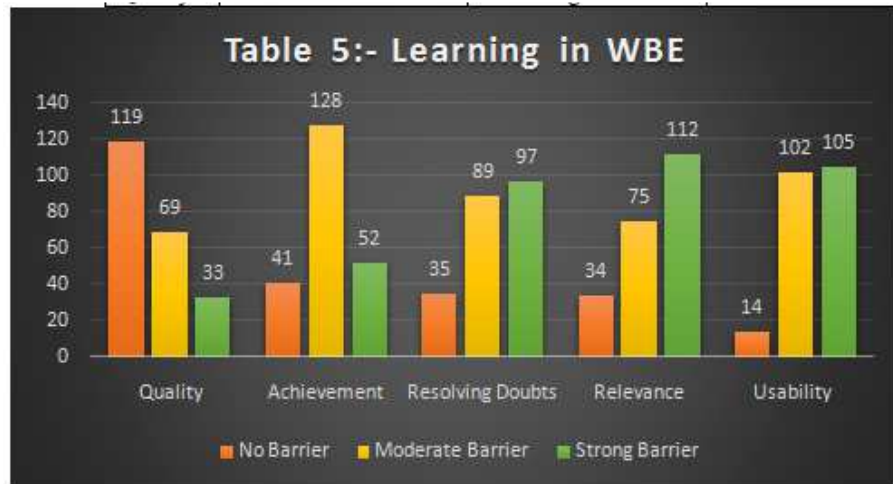


Figure 5

In the department of learning it was found that quality was good as it was perceived as no barrier. The achievement was perceived as a moderate, resolving doubts and usability were balanced between moderate and strong barrier. Relevance to needs was perceived as a strong barrier.

Evaluation

In order to analyze the output and effectiveness of Web-Based Education, evaluation is essential. The components of evaluation which need to be analyzed are as follows

Table 6

Evaluation				
Comprehensiveness	Validity	Security	Lack of Competition	Lack of Comparisons

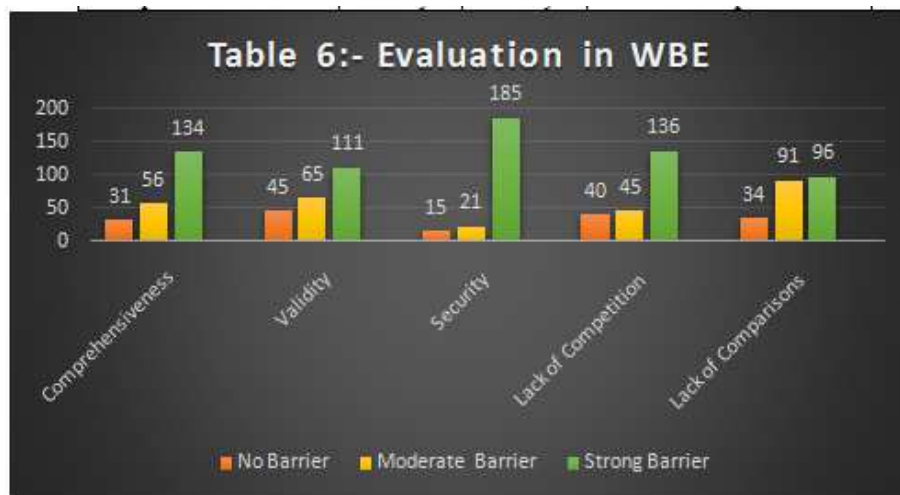


Figure 6

In the evaluation of web-based learning the elements of comprehensiveness, validity, security, and lack of competition were perceived as strong barriers and lack of comparisons was perceived as a moderate to the strong barrier.

Support

The support system in any Innovation plays a major role in its implementation. In Web-Based Education support plays a major role as the learner is isolated or at a distance and thus the following components are crucial.

Table 7

Support				
Instructor Accessibility	Peer interaction	Technology support	Financial Support	Administrative Support

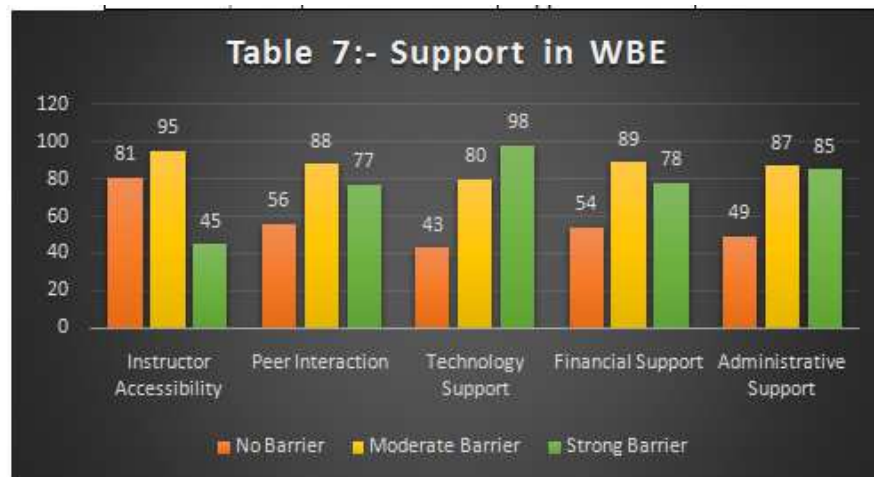


Figure 7

While evaluating support the teachers presented a mixed response to instructor accessibility between moderate to no barrier, whereas peer interaction, technology support, financial support, and administrative support the responses were between moderate to the strong barrier.

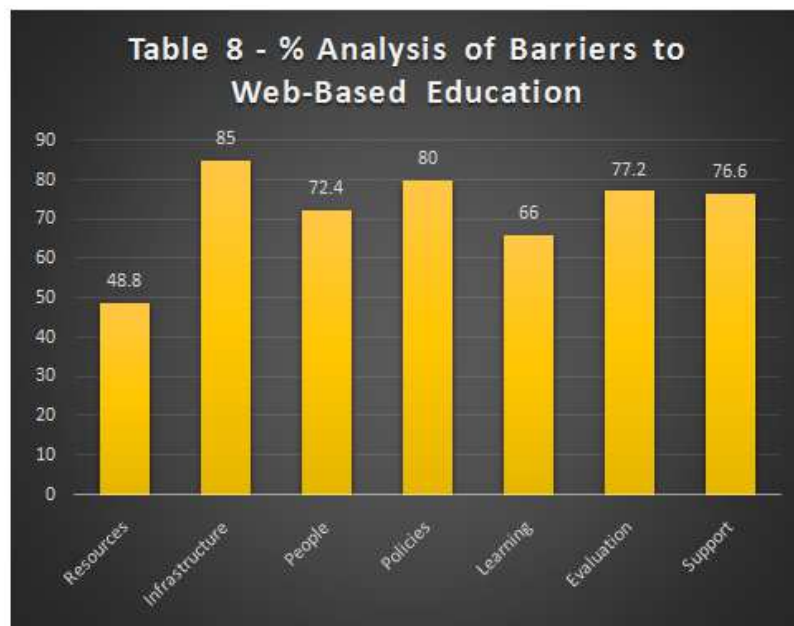


Figure 8

The percentage level of barrier in web based education was found to be as follows : Resources =48.8%, Infrastructure = 85%, People = 72.4%, Policies= 80%, Learning= 66%, Evaluation=77.2%, and Support= 76.6%. Only resources were not identified as a barrier, learning was a moderate barrier and all the other elements were identified as strong barriers.

CONCLUSIONS

The following conclusions were drawn from the results of the survey.

- **Not a barrier:** Variety in resources and quality of learning.
- **Not a barrier to Moderate barrier:** Instructor accessibility under support.
- **Moderate barriers:** The quality of content under resources, Motivation, teacher support and peer support under people, curriculum under policies and achievement under learning.
- **Moderate to Strong barriers:** Usability and accessibility of resources, resolving doubts and utility in learning, lack of comparisons in evaluation, peer interaction, technology support, financial support and administrative support in support.
- **Strong Barriers:** Language of resources, Availability of computer at school Internet access at school/college, Availability of computer at home, Internet access at home and Updated software in Infrastructure, technical expertise and Self discipline of people, Teacher training, recognition and credibility, finances and administration in policies, relevance to needs in learning, comprehensiveness, validity, security, and lack of competition in evaluation.
- **Percentage Analysis of Barriers:** In web-based education concluded that resources are not a barrier, learning is a moderate barrier, People, Evaluation and Support are moderate to strong barriers and Policies and Infrastructure were strong barriers.

RECOMMENDATIONS

Online technologies are constantly changing thus giving rise to new challenges in education. Schools and colleges are facing the challenge of integrating technology into teaching and learning in order to enhance effectiveness improve the quality of education being imparted. Web-based education offers schools and colleges an avenue to reach out to new students, innovative ways of interacting with current students, reduction in costs which will help in providing economy education, and optimizing the use of resources. If web-based education is achieving its aims, it is the teachers who must take the initiative and assume leadership roles in the design, use, and evolution of web-based education programs. Educational administrators and policymakers must also play an active role in their efforts to propagate the implementation of WBE at the ground level and the concerns should be addressed. If the administrators understand and address the factors that the teacher have identified as barriers to the implementation of web-based education then only it can benefit the main consumers of WBE which are colleges, schools, teachers, and students. Based on the findings of this study, administrators and policymakers should focus on understanding, accounting and dealing with the teacher's concerns related to technological infrastructure and formulate policies and provide the necessary support required to encourage as well as facilitate web-based education.

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